

REMARKS

A. Regarding the Amendments

By the present communication claims 1,13, and 15 have been amended and new claims 40-42 have been added to more particularly define Applicants' invention. As amended, the claims are supported by the specification and the original claims and add no new matter. For example, support for the term "improved", as recited in claims 1 and 13 is found in the specification at page 7, paragraph 31. In addition, as recited in new claim 40, support for electrical structures having at least one electrode is found throughout the specification (see e.g., page 24, paragraph 86). Finally, support for claims 41 and 42 is found throughout the specification, (see, e.g., page 10, paragraph 39; page 11, paragraph 46; page 3, paragraph 9). Upon entry of the amendments, claims 1-5, 9-17, 21-30, and 40-42 are under consideration.

B. Rejections Under 35 U.S.C. § 102(b)

The rejection of claims 1-5, 9-11, 13-17, 21, and 25-30 under 35 U.S.C. § 102(b) as allegedly being anticipated by Linford et. al. (U.S. Patent No. 5,429,708) is respectfully traversed. In utilizing Linford as the basis for a rejection under 35 U.S.C. § 102(b), the Examiner is asserting that Linford describes each and every aspect of the electrical structures set forth in the present specification either expressly or inherently. For the reasons set forth below, Applicants respectfully disagree that Linford teaches each and every aspect of the present invention.

Applicants' invention distinguishes over Linford by requiring an electrical structure comprising a silicon-containing material having a surface, and an organic layer chemically bonded to the surface of the silicon-containing material, wherein an electrical property of the electrical structure is significantly improved compared to a same structure without the organic layer. In contrast, Linford merely describes silicon materials containing modified surfaces. It is respectfully submitted that Linford's surface modified silicon materials are not electrical

structures. Indeed, in stark contrast to the present specification, Linford does not describe the preparation of any electrical structure.

In an effort to support the rejection, the Examiner cites Linford's background discussion (e. g., col. 1, lines 15-17), stating that silicon is used in the manufacture of electronic devices, solar cells, chemical sensors, etc. However, it is submitted that this is merely a general statement regarding the current state of the art in manufacturing electrical devices. In other words, those skilled in the art would readily acknowledge that electrical devices typically comprise silicon. Linford's invention is only drawn to silicon material having a modified surface. Applicants respectfully submit that a surface-modified silicon material is not equivalent to an electrical structure containing a surface-modified silicon material.

Indeed, there is far more involved in creating an electrical structure than merely attaching an organic layer to a silicon surface. For example, as set forth in the present specification, to transform silicon material (surface-modified or not) into an electrical structure, the silicon material must include features such as electrodes, source/drain regions, and the like. The present specification (see page 24, paragraph 86 to page 30, paragraph 103) describes a variety of exemplary electrical structures according to the invention (capacitors, MOSFETs, and the like). In addition, once an electrical structure is created from silicon, electrical properties such as surface recombination velocity, voltage, and the like are measured and optimized depending on the intended application for the structure. All of this information is contained in the present specification and is absent from Linford's disclosure.

Moreover, as evidenced in the accompanying Declaration, attaching an organic layer to a silicon surface does not inherently result in a structure having improved electrical properties. In particular, the Declaration presents data showing that certain organic layers attached to a silicon surface actually have a deleterious effect on electrical properties. Specifically, Linford fails to appreciate this important distinction between producing a surface-modified silicon

material and an electrical structure containing such a surface-modified material. Indeed, based on Linford's disclosure, a skilled artisan could not determine whether or not the surface-modified silicon material would provide improved electrical properties since no such properties are measured, and indeed, no electrical structures are even provided. Thus, Applicants' invention does not "necessarily flow" from Linford's disclosure, and therefore Linford et. al. can not inherently anticipate the present invention.

In the Advisory Action, the Examiner asserts that the Declaration is allegedly deficient since the data therein fails to provide evidence that all electrical properties are not improved, and that the Declaration has not addressed all of the organic materials set forth in Linford and Tsukune. It is respectfully submitted that it is unnecessary and unreasonable to require Applicants to test each and every electrical property and each and every organic group set forth in the cited references in order to address the inherency issue. Applicants have clearly demonstrated that attaching an octyl group to a silicon surface, as set forth by Linford, does not improve the carrier lifetime of a device prepared therefrom. This fact sufficiently demonstrates that Linford, et. al. can not inherently anticipate the present invention. Further testing of other organic groups and other electrical properties would be merely a cumulative exercise, and is simply not required to address the inherency issue. In summary, Applicants have demonstrated that at least one of the groups set forth in the cited references does not improve at least one electrical property of a device prepared therefrom. Accordingly, the cited references can not inherently anticipate the present invention.

For all of the reasons set forth above, it is respectfully submitted that Linford's disclosure is insufficient to meet each and every element of Applicants' invention. Accordingly, reconsideration and withdrawal of the rejection of claims 1-5, 9-11, 13-17, 21, and 25-30 under 35 U.S.C. § 102(b) are respectfully requested.

The rejection of claims 13 and 21-24 under 35 U.S.C. § 102(b) as allegedly being anticipated by Tsukune, et. al. (JP 6-84853 A) is respectfully traversed. Applicants' invention,

as defined for example, by claim 13, distinguishes over Tsukune by requiring a process for forming an electrical device comprising providing a silicon-containing material having a surface, and forming an organic layer chemically bonded to the surface of the silicon-containing material, wherein an electrical property of the electrical device is significantly improved compared to a same device if the organic layer is not formed.

The reasoning set forth above with respect to Linford also applies to Tsukune. Like Linford, Tsukune merely describes a process for attaching methyl groups to a silicon surface. For the reasons set forth above, a silicon wafer having a methylated surface is not equivalent to an electrical structure containing a surface-modified silicon material. Moreover, in contrast to the process defined by Applicants' claimed invention, Tsukune does not require that an electrical property of a device containing a modified silicon surface be significantly improved compared to a device containing an unmodified silicon surface. Like Linford, Tsukune provides no measurement of the electrical properties of the surface-modified silicon material and also provides no electrical structures containing surface-modified silicon. One could not determine whether Tsukune's modification would result in an electrical structure with improved properties, since, as set forth in the accompanying Declaration, certain organic layers attached to a silicon surface do not improve electrical properties of an electrical structure prepared therefrom. Like Linford, Tsukune fails to appreciate this important distinction between producing a surface-modified silicon material and an electrical structure containing a surface-modified material, wherein the surface modification results in improved electrical properties. Thus, it is respectfully submitted that Tsukune does not describe each and every element required by present claims 13 and 21-24. Accordingly, reconsideration and withdrawal of the rejection of these claims under 35 U.S.C. § 102(b) are respectfully requested.

C. Rejection Under 35 U.S.C. § 103(a)

The rejection of claim 12 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Linford in view of Aboaf, et. al. (U.S. Patent No. 3,961,353) is respectfully traversed. Reliance on Aboaf fails to cure the deficiencies of Linford. Like Linford, Aboaf does not describe an electrical structure comprising a silicon-containing material having a surface, and an organic layer chemically bonded to the surface of the silicon-containing material, wherein an electrical property of the electrical structure is significantly improved compared to a same structure without the organic layer, wherein a portion of the silicon-containing material immediately adjacent to the organic layer has a porosity no greater than approximately 30 percent. Instead, Aboaf merely describes methods for producing semiconductor devices having a porous layer of silicon. Thus, neither Linford nor Aboaf, alone or in combination, disclose the electrical structures required by the present invention.

Moreover, it is respectfully submitted that there is no motivation to combine Linford with Aboaf absent the teachings of the present invention. Indeed, Linford is silent with respect to porosity of a silicon layer. Thus, the motivation to combine is clearly provided by Applicants' specification. Such use of Applicants' specification is respectfully submitted to be improper. Accordingly, reconsideration and withdrawal of the rejection of claim 12 under 35 U.S.C. § 103(a) are respectfully requested.

In addition, for all of the reasons set forth above, it is respectfully submitted that the rejections do not apply to new claim 40. None of the cited references disclose or suggest an electrical structure comprising a silicon-containing material having a surface and at least one electrode, wherein the silicon-containing material is capable of conducting electric current, and an organic layer chemically bonded to the surface of the silicon-containing material, wherein an electrical property of the electrical structure is significantly improved compared to a same structure without the organic layer.

Application No.: 09/905,157
Applicant: Lewis and Royea
Filed: July 12, 2001
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CONCLUSION

In view of the above amendments and remarks, reconsideration and favorable action on all claims are respectfully requested. In the event any matters remain to be resolved, the Examiner is requested to contact the undersigned at the telephone number given below so that a prompt disposition of this application can be achieved.

Enclosed is a check in the amount of \$840.00, which consists of \$375.00 for the filing fee and \$465.00 for the Three (3) Month Extension of Time fee. The Commissioner is hereby authorized to charge any other fees associated with the filing submitted herewith, or credit any overpayments to Deposit Account No. 50-1355.

Respectfully submitted,

Date: September 4, 2003



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